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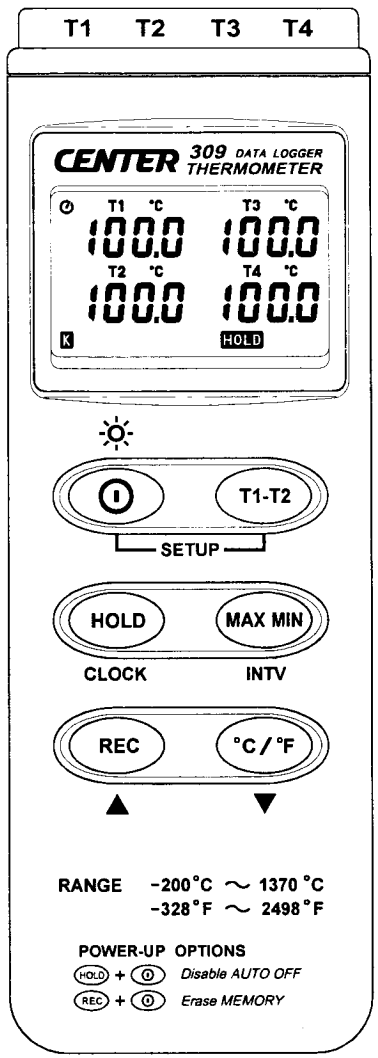
309-00

Instruction Manual

RS-232

CENTER® 309 Datalogger

THERMOMETER



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I. Introduction:

This instrument is a four channel digital thermometer for use with any K-type thermocouple as temperature sensor. Temperature indication follows National Bureau of Standards and IEC584 temperature/voltage table for K-type thermocouples. It internal memory can keep up to 16,000 records per channel. (note1.) It uses RS232 interface to perform bi-directional communication with PC.

II. Specifications:

Numerical Display: 4 digital Liquid Crystal Display per channel.

Measurement Range: -200°C ~ 1370°C -328°F ~ 2498°F

Resolution: -200°C~ 200°C 0.1°C; 200°C ~1370°C 1°C
-200°F~ 200°F 0.1°F; else 1°F

Input Protection at Thermocouple Input: 60V DC, or 24Vrms AC

Environmental:

- ❑ Operating Temperature and Humidity: 0°C ~50°C (32°F ~ 122°F) ; 0 ~ 80% RH
- ❑ Storage Temperature and Humidity: -10°C to 60°C (14°F ~ 140°F); 0 ~ 80% RH
- ❑ Altitude up to 2000 meters.

Accuracy: at (23 ± 5°C)

Range	Accuracy
-200°C ~ 200°C	±(0.2% reading + 1°C)
200°C ~ 400°C	±(0.5% reading + 1°C)
400°C~1370°C	±(0.2% reading + 1°C)
-328°F ~ -200°F	±(0.5% reading + 2°F)
-200°F ~ 200°F	±(0.2% reading + 2°F)
200°F ~ 2498°F	±(0.3% reading + 2°F)

Temperature Coefficient:

For ambient temperatures from 0°C ~ 18°C and 28°C ~ 50°C, for each °C ambient below 18°C or above 28°C add the following tolerance into the accuracy spec.
0.01% of reading + 0.03°C
(0.01% of reading + 0.06°F)

⚠ **Note:**
The basic accuracy Specification does not include the error of the probe. Please refer to the probe accuracy specification for additional details.

Electromagnetic Compatibility: Total accuracy = specified accuracy ±2°C(3.6°F)

Sample Rate: 3 seconds per period

Dimension: 184x64x30mm

Weight: 250g Approx.

Accessory: K Type Bead Probex 2, Battery, Carrying Case, Instruction Menu, Software program, RS-232 Connection Cable

Power requirement: 9 Volt Battery

Battery Life: Approx. 100hrs with alkaline battery

AC Adapter: 9VDC ±15% 100mA

Plug Diameter: 3.5mmx1.35mm

Option : AC Adapter

note1:
Every time you press "REC" button to start recording data and press "REC" button again to stop recording, there will be a data set in memory, you can store as many data sets as you want until memory is full.

III. Symbol Definition and Button Location:

▬ : This indicates that the minus temperature is sensed.

°C°F : Centigrade and Fahrenheit indication.

K : Thermocouple Type Indication.

MAX : The Maximum value is now being displayed.

MIN : The Minimum value is now being displayed.

: This indicates auto power off is enabled.

HOLD : This indicates that the display data is being held.

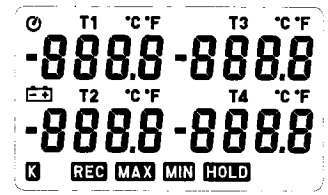
: The Battery is not sufficient for proper operation.

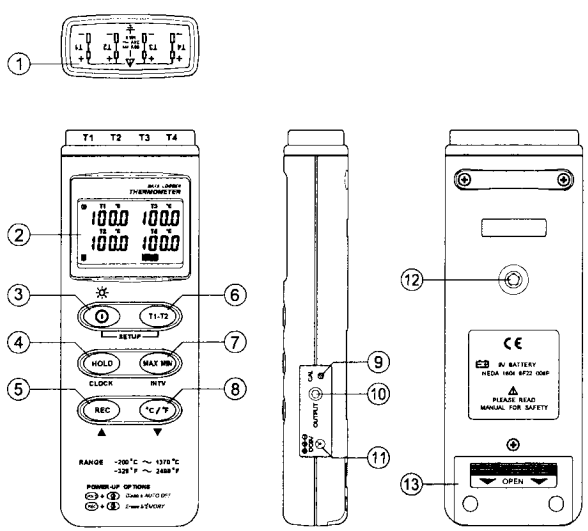
T1,T2,T3,T4 : It indicates the value below is T1, T2, T3, T4 Temperature sensor.

: It indicates the value below is T1-T2 sensor.

ΔREL : The reading is now under relative mode.

REC : This indicates that the tester is recording. If it blinks, it indicates the memory is full.





Button Location:

① K type temperature sensor T1 to T4 input connector
② LCD display
③ ON/OFF & Backlight button
④ Hold button
⑤ Record button
⑥ T1-T2 button
⑦ MAX MIN function control button
⑧ °C, °F control button
⑨ Offset calibration screw
⑩ Digital output connector
⑪ AC power adapter connector
⑫ Tripod connector
⑬ Battery cabinet cover

IV. Operation Instructions:

4.1 Power-Up & Turn ON/OFF backlight

The ⏻ key turns the Thermometer ON or OFF and backlight ON & OFF.
Press it once to turn on the Thermometer.
Press it again for moment to turn ON or OFF backlight.
Press and hold this button 3 second to turn OFF the power.

4.2 Connection the Thermocouples

For measurement, plug the thermocouple into the input connectors.

4.3 Selecting the Temperature Scale

When the meter was powered on, the user may change it to Fahrenheit (°F) by pressing " **°C/°F** " button and vice versa to Celsius.

4.4 Data-Hold Operation

The user may hold the present reading and keep it on the display by pressing the "**HOLD**" button. When the held data is no longer needed, one may release the data-hold operation by pressing "**HOLD**" button again.
When the meter is under Data Hold operation, the **"MAX MIN"**,**"T1-T2"** and **"°C/°F"** button are disabled. (when you press " **°C/°F** ", **"T1-T2"** and **"MAX MIN"** button in HOLD mode, there will be two continuous beeps)

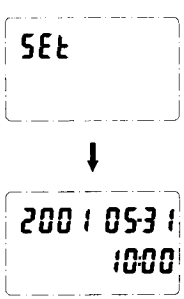
4.5 T1-T2 Operation:

When this button is pushed, "*1 - 2* " will be shown on the upper right hand side LCD display to indicate that the tester is under T1 minus T2 mode. The temperature difference is shown on the right hand side display as shown in Fig.

4.6 Record and Erase memory Operation:

When one presses the "REC" button, the meter will start recording, and pressing the "REC" button again will stop recording, If you want to clear the memory, power off the meter, then press and hold "REC" button and then press power button and hold at least 5 seconds, then LCD will show "CLR" "SURE 5", then release all buttons to clear the memory.

4.7 Clock Setup :

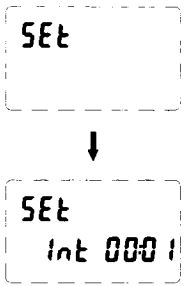


1: press and hold "T1-T2" button and then power on the meter:

2: press "HOLD"(clock):

3: press "REC" ▲ or "°C/°F" ▼ to increase or decrease number, press "HOLD"(clock) to adjust next item. The adjusting order is year→month→day→hour→minute, then press "HOLD" (clock) to finish adjusting. If you want abort during a setup process, press power button to cancel.

4.8 Recording Interval Setup :



1: press and hold "T1-T2" button and then power on the meter:

2: press "MAXMIN"(INTV)

3: press "REC" ▲ or "°C/°F" ▼ to increase or decrease number, press "MAXMIN " (INTV) to adjust next item, then press "MAXMIN" (INTV) to finish. If you want abort during a setup process, press power button to cancel.

4.9 MAX/MIN Operation:

When pressing the "MAX MIN" button the meter will enter the MAX/MIN mode. Under this mode the maximum value, minimum value is kept in the memory simultaneously and updated with every new sample of data.
When the MAX symbol is display, the Maximum is shown on the display.
Press "MAX MIN" again, then the MIN symbol is on the display and also the minimum reading.
Press "MAX MIN" again, MAX, and MIN will blink together. This means that all these data is updated in the memory and the reading is the present temperature.
One may press "MAX MIN" to circulate the display mode among these options.
When the meter is under "MAX MIN" operation and " **°C/°F** " button are disabled.(when you press " **°C/°F** " button in "MAX MIN" mode, there will be two continuous beep)
To exit the MAX/MIN mode, one may press and hold "MAX MIN" for two seconds.

4.10 Auto Power Off:

By default, when the meter is powered on, it is under auto power off mode. The meter will power itself off after 30 minutes if no key operation and no RS232 communication combination at power on can disable auto power off.
One may press and hold "**HOLD**" button and then power on the meter and there will be two successive beeps to indicate that auto power off is disabled and the ⏻ will not show up.

4.11 Low Battery Condition

When the battery voltage is under proper operation requirement, the ⊟+ symbol will show on the LCD and the battery need to be replaced with new one.

4.12 Calibration Point:

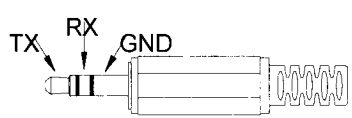
input	Adjust VR	tolerance
0 °C	VR1	± 0.1 °C
190 °C	VR2	± 0.1 °C
1000 °C	VR3	± 1 °C
1900 °F	VR4	± 1 °F

P.S

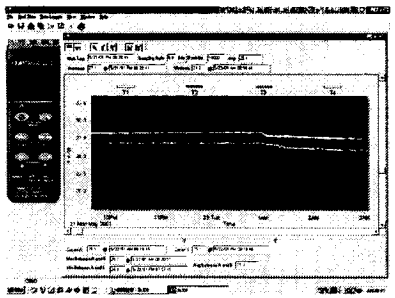
Normally, performing offset Calibration with thermal stabled ice water through VR1 will give a very good calibration result.

4.13 Digital Output:

The Digital Output is a 9600bps N 81 serial interface.
The RX is a 5V normal high input port.
The TX is a 5V normal high output port.



V. Setup TestLink SE-309 —RS232 interface software:



- **The TestLink package contains:**
  1.80mm CD.
  2.Custom designed RS232 cable for TestLink.
- **System Required:**
  Windows 95 or Windows 98 or Windows NT 4.0 above.
- **Minimum Hardware Required:**
  PC or NoteBook with Pentium 90MHz or higher, 32 MB RAM ;
  At least 5 MB byte hard disk space available to install TestLink. Recommended resolution 800X600.
- **Install TestLink:**
  1.We recommend close all other application before installing TestLink.
  2.Insert setup CD disk to CD disk drive.
  3.Choose the Start button on the Taskbar and select Run.
  4.Type E:\SETUP and choose OK, then it will copy SE309.exe (executable file) and help file to your hard disk (default is c:\program files\TestLink\SE309).
  For detailed other operation instruction, please refer to the online help while executing SE309.

Appendix: Thermocouple probe specification

Model	Range	Tolerances	Description
TP-K01 Bead probe	-50℃ to 200℃ -58℉ to 392℉	±2.2℃ or ±0.75% (±3.6℉ or ±0.75%)	with Teflon tape insulation Maximum insulating temperature : 260℃

TP-K01:
probe for general condition measurements, especially for complex and hard to reach places.